

**Southern California Priority Corridor
Showcase Program Evaluation**

**Corridor-wide
Advanced Transportation Management System
(CWATMS)
Evaluation Report**

FINAL

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CONTENTS

Disclaimer	ii
Abbreviations & Acronyms	iii
Executive Summary	1
Background	1
Evaluation Findings, Conclusions, and Recommendations	2
1 Introduction	4
1.1 Purpose and Scope of this Report	4
1.2 Evaluation Design and Approach	5
1.3 Organization of this Report.....	7
1.4 Privacy Considerations	7
1.5 Constraints & Assumptions	8
1.6 Project Background	8
2 Project/System Technical Description.....	11
3 System Performance Evaluation.....	13
3.1 The Project/System Development Process and Timeline	13
3.2 Impact of Showcase Integration on Project Deployment and System Performance	24
4 Cost Evaluation	26
4.1 Constraints & Assumptions	26
4.2 Project Budget	26
5 Institutional Impacts Evaluation	27
5.1 Impacts to Local Planning Processes, Policy Development, and the Mainstreaming of ITS.....	27
Conclusions and Recommendations.....	28
Endnotes/References.....	30

Disclaimer

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Abbreviations & Acronyms

ATIS	Advanced Traveler Information System
ATMIS	Advanced Traffic Management & Information System
ATMS	Advanced Transportation Management System
AVL	Automatic Vehicle Location
Caltrans	California Department of Transportation
CCTV	Closed-circuit Television surveillance camera
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CHP	California Highway Patrol
CM	Configuration Management
CMP	Configuration Management Plan
CMS	Changeable Message Sign
CORBA	Common Object Request Broker Architecture
COTS	Commercial Off-the-Shelf
CTC	California Transportation Commission
CVO	Commercial Vehicle Operations
CW	Corridor-wide
CWATIS	Corridor-wide Advanced Traveler Information System Project
CWATMS	Corridor-wide Advanced Transportation Management System Project
CWCVO	Corridor-wide Commercial Vehicle Operations Project
CWSIP	Corridor-wide Systems Integration Project
CWSP	Corridor-wide Strategic Planning Project
DOIT	Department of Information Technology
DRI	Caltrans Division of Research & Innovation (formerly NTR)
EAP	Evaluation Activity Plan
EP	Evaluation Plan
FHWA	Federal Highway Administration
FSR	Feasibility Study Report
FTA	Federal Transit Administration
FTE	Full-Time Equivalent (one full-time employee)
GPRA	Government Performance and Results Act
GUI	Graphical User Interface
HP	Hewlett-Packard
HQIT	Headquarters - Information Technology (division of Caltrans)
IDL	Interface Definition Language
IPR	Intellectual Property Rights
ISP	Information Service Provider
ISSC	Information Systems Service Center (division of Caltrans)
ISTEA	Intermodal Surface Transportation Efficiency Act (of 1991)
ITS	Intelligent Transportation Systems
LACDPW	Los Angeles County Department of Public Works
LADOT	City of Los Angeles Department of Transportation
LAN	Local Area Network

MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
MTA	Los Angeles County Metropolitan Transportation Authority
MTBF	Mean Time Between Failure
NDA	Non-Disclosure Agreement
NET	National Engineering Technology Corporation
NTCIP	National Transportation Communications for ITS Protocol
NTR	Caltrans Division of New Technology & Research (now DRI)
OCMDI	Orange County Model Deployment Initiative
OCTA	Orange County Transportation Authority
O&M	Operations and Maintenance
OS	Operating system (such as Windows™, Unix, Linux, et. al.)
PC	Personal Computer (Windows™-based)
RCTC	Riverside County Transportation Commission
RFP	Request for Proposals
RTP	Regional Transportation Plan
RTPA	Regional Transportation Planning Agency
RWS	Remote Workstation
SANBAG	San Bernardino Association of Governments
SANDAG	San Diego Association of Governments
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCPCSC	Southern California Priority Corridor Steering Committee
TEA-21	Transportation Equity Act for the 21st Century
TIC	Traveler Information Center
TMC	Transportation Management Center
TOC	Traffic/Transportation Operations Center
USDOT	United States Department of Transportation
VCTC	Ventura County Transportation Commission
VDS	Vehicle Detector Station
VMT	Vehicle Miles Traveled
VOS	Volume/Occupancy/Speed
WAN	Wide Area Network

Executive Summary

Background

As required by federal law, all Intelligent Transportation System (ITS) projects that receive federal funding must undergo an evaluation to help assess the costs and benefits of ITS. This document is one of 23 reports produced as part of the Southern California ITS Priority Corridor Showcase Program Evaluation to help planners and decision-makers at the federal, state and local levels make better-informed decisions regarding future ITS deployments. This report presents the experiences, costs, and lessons learned from Southern California's Corridor-wide Advanced Transportation Management System (CWATMS) project.

In 1993, the U.S. Department of Transportation designated Southern California as one of four Priority Corridors in which ITS could have particular benefit. Southern California suffers from extreme traffic congestion, limited room for expanding transportation facilities, and above-average air pollution levels. The Southern California Priority Corridor is one of the most populated, traveled, and visited regions in the country, and consists of four adjoining regions:

- ▶ Los Angeles/Ventura
- ▶ Orange County
- ▶ San Diego County
- ▶ Inland Empire (San Bernardino and Riverside Counties).

The ITS Showcase Program is one of several programs that have been implemented in Southern California's Priority Corridor to help aid mobility and mitigate traffic congestion and its associated environmental impacts. The Showcase Program consists of 17 ITS projects that collectively form a corridor-wide intermodal transportation management and information network between Los Angeles, Orange County, San Diego, and the Inland Empire. Each Showcase project deploys a piece of this corridor-wide ITS network, including regional Advanced Traveler Information Systems (ATIS), regional Advanced Transportation Management Systems (ATMS), and regional and interregional communications infrastructure. Eleven of the projects are regional in nature, while the remaining six are corridor-wide. The CWATMS project is one of the six corridor-wide projects within the Southern California Priority Corridor ITS Showcase Program.

Unlike most other projects that are being evaluated as part of the Southern California ITS Priority Corridor Showcase Program, the CWATMS project does not have a federally approved workplan and most likely will not execute a contract in time for the evaluation's completion in November 2004. This is discussed in more detail below. However, the absence of a contract does not mean that the project has not been a focus of attention or that it does not have important lessons to reveal. This evaluation focuses on the history of the CWATMS project, the reasons why it has not yet executed a contract, the impacts the project has had or not had, and other lessons learned.

Evaluation Findings, Conclusions, and Recommendations

The technical goal of the Showcase Program was to develop an interregional network over which transportation agencies around the Southern California Priority Corridor could exchange information and share field device control for better coordination and improved safety and performance. The CWATMS project could help develop a major piece of that network; however, several considerations have impacted the Priority Corridor's ability to execute a contract for the project, including:

- **Inadequate funding** – A funding request was submitted to the Federal Highway Administration (FHWA) in December 1996 based on a proposed workplan and cost estimate prepared by agency staff and consultants. Although FHWA contributed funding for the project as part of the Showcase Program, the contribution was less than the requested amount and not enough to meet the project's anticipated cost. As a result, the Priority Corridor Steering Committee was forced to begin revising the scope of the project and re-tailoring the proposed workplan to fit the available funding. However, technical and financial issues over the ensuing years have prevented the Steering Committee from reaching consensus on a final revision.
- **ATMS Version 2 (ATMS2)** – The original goal of the CWATMS project was to integrate the Advanced Transportation Management Systems at Caltrans' four Transportation Management Centers (TMCs) in the Priority Corridor. In 1999, each of these TMCs was using its own legacy ATMS software, but Caltrans had begun a process of standardizing its TMCs by developing the ATMS2 software and installing it statewide. Due to the expected reduction in both technical risk and complexity of integration, it became a foregone conclusion that CWATMS would not start until all four Caltrans TMCs received ATMS2. The deployment of ATMS2 was subsequently delayed by two statewide Y2K-related technology moratoria, and then statewide budgetary constraints.
- **Changing priorities** – Over the past 4-5 years, the four regions of the Southern California Priority Corridor have come to place local or regional integration as a higher priority than interregional or Corridor-wide integration. Los Angeles County and San Diego County are each developing their own regional networks to enable greater coordination between their respective local transportation agencies such as Caltrans, public transit providers, and city traffic departments. Orange County and the Inland Empire are predicted to do the same. One day, these four separate regional networks may be interconnected to form the Corridor-wide network envisioned by the Showcase Program.

The Priority Corridor Steering Committee's top priority was to reach consensus on CWATMS' revised scope before obligating the available money to the project. But as the scope discussion became more drawn out, ATMS2 deployment became more uncertain, and other critical issues arose around the Priority Corridor, portions of the CWATMS funding were gradually siphoned away and used for other Showcase Program uses. \$2,875,000 was initially set aside for the project, but about \$643,000 currently remains.

Although CWATMS' original goal of integrating the four Caltrans TMCs in the Priority Corridor seems a logical first step towards interregional integration, the project was ahead of its time. Dissimilar systems and practices among the Caltrans TMCs increased the risk and complexity of the integration. As steps towards reducing the risk and complexity of eventual Corridor-wide integration, Caltrans should continue its efforts to develop a single, non-proprietary statewide standard for ATMS software, and the four Southern California Caltrans districts should work together to develop a set of protocols, policies and procedures that describe how their TMCs will work together once this integration is achieved.

1 Introduction

1.1 Purpose and Scope of this Report

As required by federal law¹, all Intelligent Transportation System (ITS) projects that receive federal funding must undergo an evaluation to help assess the costs and benefits of ITS. The information provided in this report is intended to help planners and decision-makers at the federal, state and local levels make better-informed decisions regarding future ITS deployments based on the experiences of Southern California's CWATMS project.

This document is one of 23 reports produced as part of the Southern California ITS Priority Corridor Showcase Program Evaluation, and covers only the events and findings resulting from the CWATMS evaluation. The complete set of findings from the Showcase Program Evaluation are found in the following collection of documents:

Document Type/Title	Date	Document Number
17 Individual Project Evaluation Reports		
Corridor-wide ATIS Project Report	7/16/2003	65A0030/0033
Corridor-wide ATMS Project Report	10/28/2004	65A0030/0049
Corridor-wide CVO Project Report	9/27/2004	65A0030/0051
Corridor-wide Rideshare Project Report (draft)	9/9/2004	65A0030/0048
Corridor-wide Strategic Planning Project Report	10/29/2002	65A0030/0028
Fontana-Ontario ATMIS Project Report	10/15/2004	65A0030/0047
IMAJINE Project Report	3/17/2003	65A0030/0029
IMTMC Project Report	TBD	65A0030/0054
InterCAD Project Report	4/2/2003	65A0030/0030
Kernel Project Report	5/30/2003	65A0030/0031
LA ATIS Project Report	7/18/2003	65A0030/0038
Mission Valley ATMIS Project Report	10/13/2004	65A0030/0050
Mode Shift Project Report (draft)	9/7/2004	65A0030/0052
OCMDI Project Report	2/20/2004	65A0030/0040
Traffic Signal Integration Project Report	10/25/2004	65A0030/0055
Transit Mgt System Project Report (draft)	10/19/2004	65A0030/0053
TravelTIP Project Report	6/3/2003	65A0030/0036
5 Cross-Cutting Evaluation Reports		
System Performance Cross-Cutting Report	TBD	65A0030/0056
Costs Cross-Cutting Report	TBD	65A0030/0057
Institutional Issues Cross-Cutting Report	TBD	65A0030/0058
Information Management Cross-Cutting Report	TBD	65A0030/0059
Transportation System Impacts Cross-Cutting Report	TBD	65A0030/0060
Final Summary Evaluation Report		
Showcase Program Evaluation Summary Report	TBD	65A0030/0061

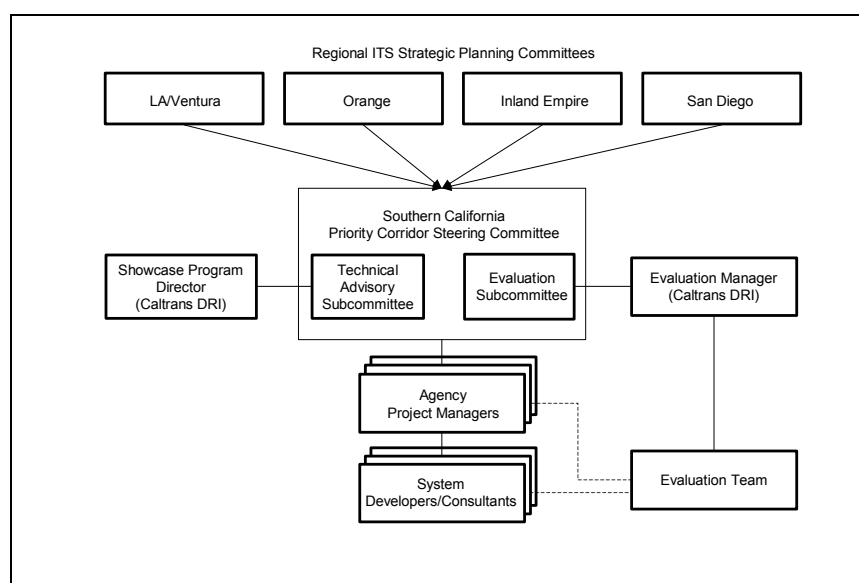
"TBD" indicates a future deliverable that is not yet available.

1.2 Evaluation Design and Approach

The findings outlined in this report are based on over four years of direct observations at project meetings, reviews of released project documents and agency memos, as well as formal and informal interviews and discussions with project partners.

The evaluation is responsive to the needs and suggestions of the Priority Corridor's Evaluation Subcommittee, which reports to the Priority Corridor's Steering Committee. As shown in Exhibit 1, both committees are comprised of stakeholders from the federal, state, and local levels.

Exhibit 1 – Management Structure and Organization of the Showcase Program



The Steering Committee's member agencies reflect wide representation from the region in terms of federal and state highway agencies, public safety, cities and counties, transit, air quality and regional planning entities, including:

- ▶ California Highway Patrol (CHP)
- ▶ Caltrans, Division of Traffic Operations (headquarters)*
- ▶ Caltrans, District 7*
- ▶ Caltrans, District 8*
- ▶ Caltrans, District 11*
- ▶ Caltrans, District 12
- ▶ City of Irvine*
- ▶ City of Los Angeles Department of Transportation (LADOT)
- ▶ City of San Diego
- ▶ Federal Highway Administration (FHWA)*
- ▶ Federal Transit Administration (FTA)

- ▶ Los Angeles County Metropolitan Transportation Authority (MTA)
- ▶ Orange County Transportation Authority (OCTA)
- ▶ Riverside County Transportation Commission (RCTC)
- ▶ San Bernardino Association of Governments (SANBAG)
- ▶ San Diego Association of Governments (SANDAG)
- ▶ South Coast Air Quality Management District (SCAQMD)
- ▶ Southern California Association of Governments (SCAG).

* Indicates an Evaluation Subcommittee member

The Showcase Program's Evaluation Design is based on a set of evaluation Goals and supporting Objectives and Measures that were developed by the Evaluation Team in partnership with federal, state and local stakeholders, and documented in the "Showcase Program Evaluation Approach" in 1998. Each individual Showcase project is evaluated based on an applicable subset of these Goals, Objectives, and Measures in order to help ensure that summary evaluation results can be aggregated from across the multiple Showcase project evaluations. The Showcase Program's five evaluation Goals include:

- ▶ Evaluate System Performance
- ▶ Evaluate Costs
- ▶ Evaluate Institutional Issues and Impacts
- ▶ Evaluate the Use and Management of Transportation/Traveler Information
- ▶ Evaluate Transportation System Impacts.

As the CWATMS evolved, project-specific refinements to the evaluation design were documented in a high-level Evaluation Plan (EP). In general, the EP describes the project and/or system under evaluation, and lays the foundation for further evaluation activities by developing consensus among the Evaluation Subcommittee and project partners as to which of Showcase's evaluation Goals, Objectives, and Measures best apply to the project.

Unlike other Showcase project evaluations, and because of the limited scope of the CWATMS evaluation, an Evaluation Activity Plan (EAP) was not developed. Data collection began after the EP had been reviewed and subsequently approved by the Evaluation Subcommittee and the project's other stakeholders.

1.3 Organization of this Report

The CWATMS Evaluation Report provides a background description of the Southern California Priority Corridor and the transportation challenges it faces. This is followed by descriptions of the Showcase Program and then, more specifically, the CWATMS project.

In general, each Showcase evaluation report is subdivided and ordered into the five topic areas (Evaluation Goals) described below:

System Performance — For CWATMS, this section will cover the project’s history by describing a chronology of important events, milestones, and decisions.

Cost — This section provides important benchmark information regarding the project budget and funding sources.

Institutional Impacts — provides important information regarding the administrative, procedural and legal impacts resulting from the project. Such impacts include changes and limitations of agency-wide policies, procedures and guidelines.

Since CWATMS did not develop, modify, install, or integrate any physical systems, the Evaluation Subcommittee and the project stakeholders concurred that an evaluation of Transportation & Traveler Information Management (Evaluation Goal 4) and Transportation System Impacts (Evaluation Goal 5) did not apply and was not warranted.

The report concludes with a summary, final remarks and recommendations for next steps. Several appendices contain supporting documentation such as technical designs and copies of evaluation data collection instruments (blank questionnaires and survey).

1.4 Privacy Considerations

Some of the information acquired in the interview and discussion process could be considered sensitive and has been characterized in this report without attribution. The Evaluation Team has taken precautions to safeguard responses and maintain their confidentiality. Wherever possible, interview responses have been aggregated during analysis such that individual responses have become part of a larger aggregate response. The names of individuals and directly attributable quotes have not been used in this document unless the person has reviewed and expressly consented to its use.

1.5 Constraints & Assumptions

The CWATMS evaluation is subject to the following constraints and assumptions:

- ▶ Although Priority Corridor funds were set aside for the CWATMS project, a contract has not been executed. Please see Section 3.1 for details regarding why a contract has not been executed.

1.6 Project Background

1.6.1 The Southern California Priority Corridor

In 1993, the U.S. Department of Transportation designated Southern California as one of four Priority Corridors in which Intelligent Transportation Systems (ITS) could have particular benefit. The Southern California Priority Corridor, illustrated in Exhibit 2, is one of the most populated, traveled, and visited regions in the country. Over 20 million people – roughly two-thirds of the state’s population – reside in or around the Southern California Priority Corridor. It suffers from extreme traffic congestion, limited room for expanding transportation facilities, and above-average air pollution levels.

The Southern California Priority Corridor consists of four distinct regions that correspond with the four Southern California Caltrans districts:

- ▶ Los Angeles/Ventura (Caltrans District 7)
- ▶ Orange County (Caltrans District 12)
- ▶ San Diego (Caltrans District 11)
- ▶ Inland Empire (Caltrans District 8)

Exhibit 2 – The Southern California Priority Corridor and Vicinity



Exhibit 3 – Population and Number of Registered Vehicles by County

County	Population² (as of 1/1/2003)	Registered Vehicles^{3*} (as of 12/31/2002)	Caltrans District
Los Angeles	10 million	6.7 million	7
Orange	3 million	2.2 million	12
San Diego	3 million	2.3 million	11
San Bernardino	1.8 million	1.3 million	8
Riverside	1.7 million	1.2 million	8
Ventura	0.8 million	0.7 million	7
Imperial	0.15 million	0.1 million	11
Total	20.5 million	14.5 million	

*Includes autos, trucks, and motorcycles. Trailers not included.

1.6.2 The Southern California Priority Corridor's ITS Showcase Program

The ITS Showcase Program is one of several programs that have been implemented in Southern California's Priority Corridor to help aid mobility and mitigate traffic congestion and its associated environmental impacts.

The Southern California ITS Showcase Program consists of 17 individual ITS projects that collectively form a corridor-wide intermodal transportation management and information network between Los Angeles, Orange County, San Diego, and the Inland Empire. Eleven of the projects are regional in nature, while the remaining six are corridor-wide in scope. The CWATMS project is one of the six corridor-wide projects.

The 17 Showcase projects are listed by region in Exhibit 4. Eight of the projects were fast-tracked and designated "Early Start" projects because of their importance as base infrastructure and potential to act as role models for the rest of the Showcase Program.

Exhibit 4 – The 17 Showcase Projects and their Status as of August 2004

Project	RFP Issued	Contractor Selected	Contract Executed	Project Underway	Project Complete
Corridor-wide					
Scoping & High Level Design (Kernel)*	✓	✓	✓	✓	✓
Strategic Planning/Systems Integration	✓	✓	✓	✓	✓
CVO					
ATIS	✓	✓	✓	✓	✓
ATMS					
Rideshare	✓	✓	✓	✓	✓
Los Angeles Region					
IMAJINE*	✓	✓	✓	✓	✓
Mode Shift*	✓	✓	✓	✓	✓
LA ATIS	✓	✓	✓	✓	✓
Inland Empire Region					
Fontana-Ontario ATMIS	✓	✓	✓	✓	✓
Orange County Region					
TravelTIP*	✓	✓	✓	✓	✓
OCMDI	✓	✓	✓	✓	✓
San Diego Region					
InterCAD*	✓	✓	✓	✓	✓
Mission Valley ATMIS*	✓	✓	✓	✓	✓
IMTMS/C (ATMSi)*	✓	✓	✓	✓	
Traffic Signal Integration (RAMS)	✓	✓	✓	✓	
Transit Management System*	✓	✓	✓	✓	

* Indicates an "Early Start" project.

☐ CWCVO and CWATMS do not yet have approved workplans.

2 Project/System Technical Description

The vision of the Southern California ITS Priority Corridor Steering Committee is to significantly improve the safety, efficiency, and environmental impacts of the region's intermodal transportation system through the application of advanced transportation technologies and integrated management systems. To that end, the Showcase Program aimed to create a corridor-wide intermodal transportation management and information network (the Showcase Network) between Los Angeles, Orange County, San Diego, and the Inland Empire.

To facilitate the integration and interoperability of the various new and existing systems at all of the partner agencies, the Priority Corridor Steering Committee commissioned the development of a corridor-wide Showcase Architecture as part of the multi-phase Scoping & Design contract. National Engineering Technology (NET) and Iteris (formerly Odetics) were selected as a team to work the project and ultimately design Showcase's "Kernel/Seed" architecture.

Under the Showcase Architecture, "Seed" software installed at agency centers (typically on workstations developed by the regional Showcase projects) utilize interfaces defined by the architecture to translate data and commands back and forth between the various partner agencies' disparate legacy systems. The data and commands were to be communicated across the interregional Showcase Network, which would be managed by a set of four "Kernel" servers distributed around the Corridor (see Exhibit 5). The Kernels provide "common services" that enable regional centers (the workstations in the TMCs and dispatch centers) to log on/off of the network, view a "white pages" and "yellow pages" of data that is available on the network, as well as publish and subscribe to available traffic "event" information. The Kernels monitor the communications system and alert the regional agency centers to system failures. Common network services provided by the Kernels include:

Security – This service authenticates a user on the network, and allows the user to be assigned privileges and priorities to receive information and control devices.

Naming – This service provides a "white pages" style directory of the other agencies on the network and the data that each provides. This effectively provides the user with a list of data sources from which to select.

Trader – This service is the "yellow pages" complement to the Naming service.

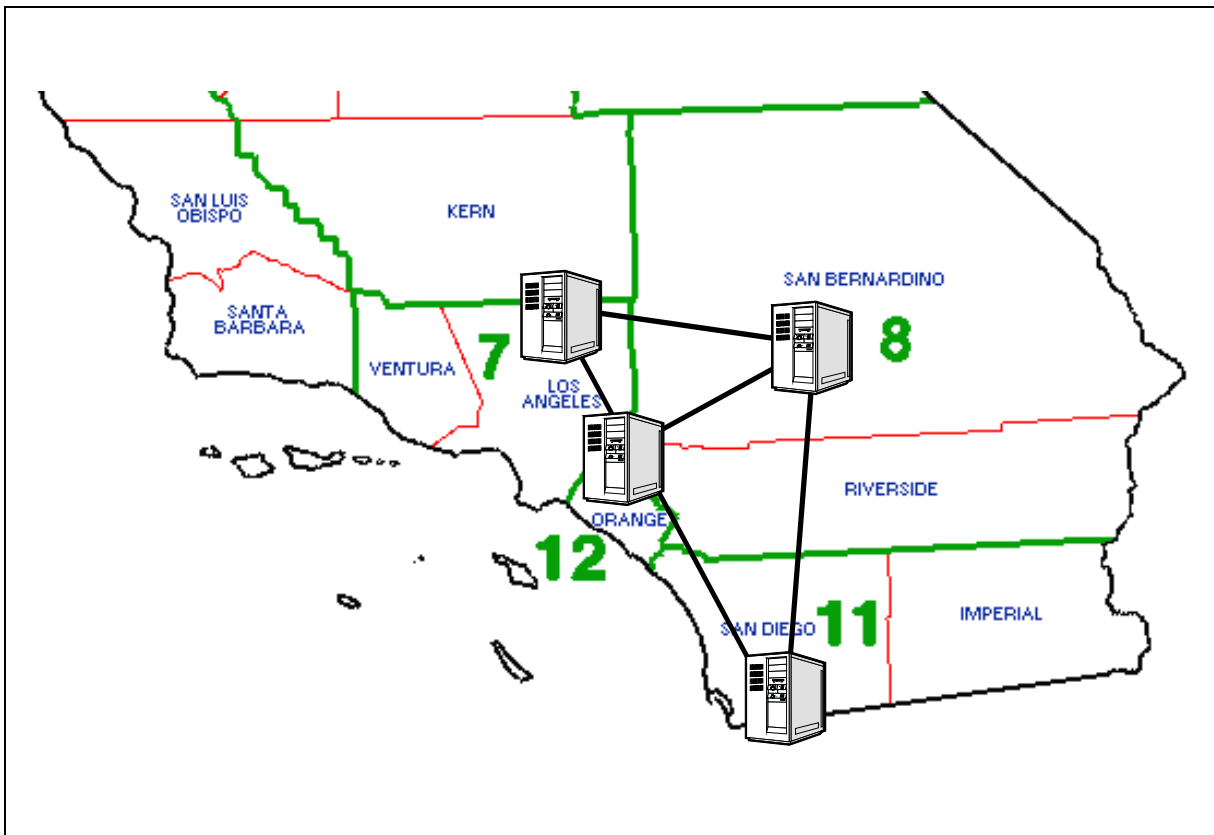
Publish & Subscribe (P&S) – This service allows agencies to select certain data to "publish" out onto the network based on criteria such as mode, location, and severity. This service is generally used for sharing traffic advisories and event information. The agencies that wish to receive this data can "subscribe" by setting their filter criteria accordingly. In this way, P&S allows agencies to control what information they release, as well as filter and receive only the data that is important to them. Whereas P&S is the method used to distribute asynchronous (i.e., non-continuous) data such as events, a direct peer-to-peer (non-P&S/non-Kernel) connection is used to distribute continuous data such as traffic speeds and transit vehicle locations.

Query – The query service allows an agency to search through data that has been published or archived by other agencies on the network in order to find particular items of interest. For example, a query could be used to find all of the traffic incidents in the last six months that were of major severity. Each agency, however, can limit which of its data is accessible to queries by using the service’s built-in security settings.

Location Translation – The Kernel provides software routines that agency centers can utilize to convert location coordinates between “State Plane,” “Route/Postmile,” and “Latitude/Longitude.”

Time Synchronization – The Kernel provides a common clock (based on the Network Time Protocol or NTP) to which centers can synchronize themselves. This is essential for coordinating time-sensitive events such as timing-out traffic advisories and prioritizing system requests.

Exhibit 5 – Geographic Distribution of the Showcase Kernel Servers



3 System Performance Evaluation

3.1 The Project/System Development Process and Timeline

The CWATMS project was delayed by the statewide rollout of ATMS2.

The CWATMS project is one of six “corridor-wide” Showcase projects. The six projects and the responsible agencies are shown below:

Project	Agency
Corridor-wide Advanced Traveler Information System (CWATIS)	Caltrans DRI
Corridor-wide Advanced Transportation Management System (CWATMS)	Caltrans DRI
Corridor-wide Commercial Vehicle Operation (CWCVO)	SANDAG
Corridor-wide Systems Integration Project (CWSIP)(later renamed CWSPP)	Caltrans DRI
Corridor-wide Rideshare	SCAG
Scoping & Design (Kernel)	SANDAG/Caltrans DRI

The original CWATMS workplan was submitted to the Federal Highway Administration (FHWA) in December 1996 as part of the Southern California Priority Corridor’s federal funding request, and proposed to connect and integrate Caltrans’ four otherwise independently operated Transportation Management Centers (TMCs) in Southern California. The four TMCs include Los Angeles (District 7), Inland Empire (District 8), San Diego (District 11), and Orange County (District 12). The TMCs would be integrated at Level 5 operation, as defined in the Showcase Architecture/Concept of Operation:

Level of Operation	Description
1	Operate independently (no integration)
2	Share data/video; single function operations
3	Share data and video; imbed modal and cross-jurisdictional responses for major/special events
4	Same as level 3 but with extensions to provide day-to-day operations
5	Same as level 4 but with added redundancies to compensate for failed systems and components
6	Centralize some or all management functions

FHWA provided \$2.3 million in federal funding to Caltrans for the CWATMS project. The money was allocated in September 1997 as part of Amendment 4 to the Showcase Program’s Federal Partnership Agreement. Together with the required non-federal 20% match, the CWATMS budget totaled roughly \$2,875,000. However, the federal contribution was less than the Corridor’s requested funding amount and the \$2.9 million budget fell short of meeting the project’s estimated cost.

To compensate for the budget shortfall, a revised project workplan was submitted to FHWA in February 1998. According to the revised workplan summary,

“The intent of this project is to integrate ATMS (for both freeway and street operations) at designated areas throughout the Southern California Priority Corridor. The Showcase Corridor-wide ATMS Project will develop an architecture that will support the deployment of a corridor-wide integrated network of ATMS through the initial integration of Caltrans/CHP TMCs at Districts 7, 11, and 12 at the level of operation 4 identified in the Showcase Concept of Operations. The integrated Caltrans/CHP TMCs will be the backbone for the purposes of coordinating regional traffic movement during recurring and non-recurring congestion.”

This February 1998 workplan proposed to leave out integration of the Inland Empire (District 8) TMC, as well as provide an initially lower level of operation (Level 4 instead of Level 5). The work would be completed in two years and over two phases: Phase 1 covering requirements and high-level design, and Phase 2 covering detailed design, implementation, and integration.

Nearly a year later in January 1999, however, the Priority Corridor’s Technical Management Subcommittee (TMS) took up discussion to revise the workplan a second time in order to reinsert the Inland Empire TMC. A motion passed to reinstate the District 8 TMC into the workplan, as well as to involve local agencies so that CWATMS would not be a “Caltrans-only” project. Level of Operation was left at Level 4. Believing that it would help attract additional federal funding, the group further deliberated on adding smaller “Just Do It” projects to the workplan. These projects would accomplish tasks that “obviously need to be done, sooner or later” such as developing database management tools. After some discussion about potential “Just Do It” projects, a decision was made to add a task to Phase 1 to research and identify the best “Just Do It” projects to pursue. Two contractors would be hired for the CWATMS project; one to complete the “Just Do It” projects, and another to complete the original Phase 1 scope (requirements and high-level design).

There was some confusion as to whether the CWATMS project was intended to create the network connections between the four Kernel servers. Although that may have been the case at one time, the January 1999 TMS meeting asserted that integration of the four Kernels would occur as part of the separate Scoping & Design Phase 3 contract, which was developing the Kernels.

On 17 February 1999, and in anticipation of possible “Y2K” problems, California Governor Gray Davis signed Executive Order D-3-99. The order mandated that all Departments within the State of California defer any new non-Y2K information technology (IT) projects not required by law. Any request for exemption would require approval by the Department of Information Technology (DOIT). D-3-99 restricted activities through July 1, 2000.

The Technical Management Subcommittee (TMS) was renamed the Technical Advisory Subcommittee (TAS) at its 23 February 1999 meeting. The imposed name change was designed to clarify the subcommittee’s role as a support tool and not a management body. It was made clear that the individual Showcase projects were free to consult the TAS, but they were not

obligated to do so since most of the projects already had their own review groups and consultants.

The February 1999 meeting agenda then turned to corridor-wide projects. The group discussed the definition of a CWATMS and what the CWATMS project should accomplish. There were also some preliminary thoughts on the Corridor-wide Systems Integration Project (CWSIP), whose workplan was also still in the planning stage. The TAS agreed, in general, that the CWSIP should address configuration management, software reuse, growth management, and communication hardware and leased lines. Furthermore, and in line with the previous month's decisions, the TAS agreed that CWATMS should update user requirements, identify "Just Do It" projects, begin detailed design, and include testing and warranty considerations.

By March 1999, the Scoping & Design Phase 3 contract was said to be "within days of contract execution." The CWSIP workplan had recently been approved by the Steering Committee and submitted to FHWA. The CWATIS workplan was being revised, while the purpose and scope of CWATMS remained a matter of discussion.

In May 1999, the San Diego Association of Governments (SANDAG), which controlled the Scoping & Design contract, issued the Notice to Proceed (NTP) for Phase 3. The Phase 3 contract included development and installation of the Kernels, but – contrary to what had been stated at the January 1999 TMS meeting – not the task of connecting the four Kernels over a network. Other plans would have to be made for completing that critical task.

Late in May 1999, Caltrans finalized the CWSIP workplan to address configuration management, software reuse, and growth management.

The CWATIS workplan was finalized in June 1999 and approved by the Steering Committee in July. The Priority Corridor's ATIS subgroup began development of an RFP with the goal of starting the project in January 2000 and completing the project by mid-2001.

At the July 1999 Steering Committee meeting, FHWA requested that some action be taken on the CWATMS workplan to stop the project from "drifting." Three proposals had been received in response to the CWSIP RFP and interviews were planned for July 22.

On 30 July 1999, the California Department of Information Technology (DOIT) announced a moratorium on the purchase and/or installation of any computer systems (hardware or software) not related to Y2K risk mitigation. The moratorium applied to all departments within the State of California for the period of 1 November 1999 through 10 March 2000. This moratorium was in addition to the one issued in February by Governor Davis, which restricted IT purchases through July 2000.

Exhibit 6 – The Effective Dates of the two ‘Y2K’ Moratoria

1999												2000											
J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
												</											

system. Although some Steering Committee members suggested using part of the remaining CWATMS funds, FHWA declared that the \$141K would not come from the CWATMS money. FHWA insisted that the unused CWATMS funds must be used for a CWATMS project, and it would not approve any other usage of the funds.

By December 2000, the CWSPP had been underway for a year. During that time, the project had begun to develop a System Integration Plan (SIP) for the Priority Corridor. The SIP was the only document to take a corridor-wide view of integrating all of the systems being developed by Showcase projects. Although the CWSPP consultant, TransCore, was not a system developer or system integrator on any of the Showcase projects, it was familiar with the high-level Showcase architecture through previous work and its ongoing association with the Priority Corridor.

The SIP provides technical overviews of the individual (regional) Showcase projects, and identifies several requirements and next steps for moving towards corridor-wide integration, including:

- ▶ *“Most of the projects can view, on a map, information referenced to a location only within their regional boundary. Therefore, although the regional systems are being designed to exchange data interregionally (i.e., corridor-wide), their user interfaces cannot display the data that comes from outside the immediate region.”*
- ▶ *“Two of the Priority Corridor projects, TravelTIP and InterCAD, are each designed to use their own communications networks that are separate and independent from the Showcase Network. Since TravelTIP is the only source of information from Orange County, this leaves a tremendous information gap in the heart of the corridor.”*
- ▶ *“Freeway incident data is only available on the Priority Corridor network for the Los Angeles-Ventura region. In the other regions, in order to be capable of providing this information, the Caltrans [ATMS] at their TMCs needs to be further upgraded. Lack of corridor-wide freeway incident information is a second serious information gap in the corridor.”*

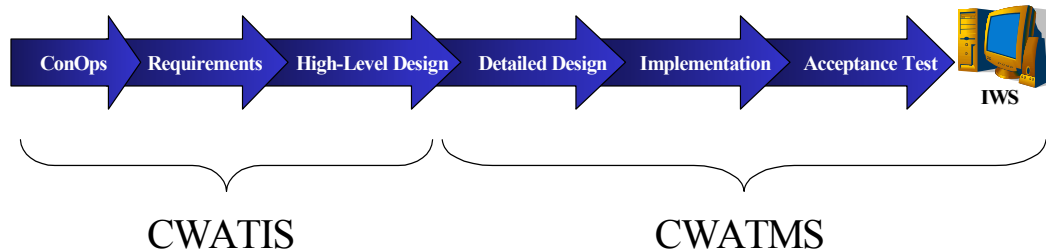
Even as the work on the SIP began back in July 2000, ten of the remaining 16 Showcase projects were already underway, and six of those were either well into system implementation or nearing completion. The CWSPP team understood that it would not be feasible for those projects to address the identified “next steps,” so these modifications would have to be deferred to subsequent software revisions and hardware upgrades during future projects.

As a solution, the SIP introduced the concept of an Integrated Workstation (IWS). The IWS would combine and integrate all of the services and functionality of the regional workstations (namely, the workstations developed under IMAJINE, TravelTIP, and Mission Valley ATMS) into a single application designed to provide corridor-wide information sharing and device control.

To build the IWS, the Steering Committee approved the use of the Showcase funds associated with the CWATIS and CWATMS projects. The workplans for these two Showcase projects

were subsequently revised in December 2000 and early 2001 to include the design and implementation of the IWS. Together, these two projects would be known as “CWATMIS.” The CWATIS project was tasked with developing the Concept of Operations, Requirements, and High-Level Design for the IWS, while the CWATMS project would build on the CWATIS effort by developing the Detailed Design and implementing the IWS. This breakdown of tasks is depicted in Exhibit 6.

Exhibit 7 – Relationship Between the CWATIS and CWATMS Projects



At the 3 April 2001 Steering Committee meeting, a task force appointed in March presented funding recommendations based on the following set of objectives:

- ▶ Produce seamless corridor-wide view of freeway and arterial congestion
- ▶ Produce corridor-wide view of incidents/events on freeways and arterials
- ▶ Enable cross jurisdictional/interregional control of CMS and CCTV
- ▶ Freeway and information dissemination and freeway management to receive highest priority

To achieve these objectives, Seeds would be required at the Priority Corridor’s four Caltrans TMCs. As of the April 2001 meeting, the District 7 (Los Angeles) Seed was being developed by the Mode Shift project. The District 8 (Inland Empire) Seed was to be developed by the Fontana-Ontario ATMS project, though enhancements might be necessary after the project. The District 11 (San Diego) Seed was to be developed by the IMTMS/C project, though, again, some enhancement might be needed after the project. The District 12 (Orange County) Seed would be developed by the CWATMIS effort. This Seed development would leverage off other Seed development to-date, provided that District 7 or District 11 could make the object definitions and other common elements of software source code available. Further discussion revealed that this might not be possible because the Showcase project contracts do not require delivery of reports, documentation or software until the end of the projects. A Caltrans staff member clarified that the vendors must be paid in full before the software source code becomes the property of Caltrans and can be shared with others.

The task force considered the following implementation priorities:

- ▶ Focus on integrating the four Caltrans TMCs in the Priority Corridor through development of Seeds for Districts 7, 8, 11, and 12 WITHOUT a corridor-wide Integrated Workstation (IWS);

- ▶ Add development of the corridor-wide IWS for the local agencies that will add arterial capabilities to support ATMIS;
- ▶ Caltrans is in the process of standardizing its TMCs by installing its ATMS2 software statewide. However, freeway incidents are NOT automatically generated by ATMS2 in District 8 and District 12 because the system's Incident Management module is not enabled in those districts. This limits the sharing of incident information with other districts over the Showcase Network. Therefore, add or enable the ATMS2 Incident Management modules in District 8 and District 12 so that freeway incidents can be detected automatically.

Based on the above objectives and implementation priorities, the staff recommended implementation of three tasks:

- ▶ Direct CWATIS to develop requirements and detailed workplan for CWATMIS, including IWS (this had already been approved by the Steering Committee);
- ▶ Develop a modularized RFP for the CWATMIS;
- ▶ Select the best proposal and proceed with the ATMIS task.

Fund allocation for the Showcase completion items was discussed next. The identified Showcase completion items included:

Communications (WAN)* [2 yrs@\$150K/yr]	\$300K (through 6/30/03)
Warrantees*	\$62K
TravelTIP migration**	\$150K
System integration/system engineering/trouble shooting for core system (contingency fund)***	\$200K
CWATMIS (balance of funds)	\$771K

* Critical to network operation

** Approved by Steering Committee in August 2000

*** Support for unforeseen items (amounts to less than 1% of contract)

In May 2001, TransCore reported that it had completed the Inventory of Deployed ATIS, Needs Assessment, Gap Analysis, and Concept of Operations (ConOps) for CWATIS, and that these same tasks were underway for the CWATMIS project. The Inventory and Needs Assessment for CWATMIS were being finalized and the Gaps were being assessed. A workshop to develop the ConOps for CWATMIS was also being planned. Caltrans reported that a schedule and RFP for CWATMS was being prepared, but that the RFP would not be released until these documents could be made available for distribution to potential bidders. This way the scope of work and bid dollars would be more realistic. Caltrans promised to have a draft workplan for CWATMS, suitable for submission to FHWA, available by early July. An outline of the workplan/RFP would be available at the June Steering Committee meeting.

A number of milestones were achieved in June 2001. Caltrans ISSC completed installation of all equipment necessary to connect the Kernels, and verified that the network was up and operating. The network was now ready for the Kernel servers to be delivered and connected.

The revised CWATMS workplan was also distributed for review and comment. CWATMS would include capabilities for freeway/arterial status, a map of the entire Priority Corridor, and functionality to coordinate incident and event management, including system response plans. The Seeds for the ATMS2 systems in the four Caltrans TMCs would enable freeway data exchange and cross-jurisdictional device control via the Showcase Network. The CWATMS project would specifically develop the Seed for District 12 (Orange County).

On 19 June 2001, a CWATMS User Requirements Workshop was conducted as part of the CWATIS project. TransCore facilitated the workshop by systematically stepping the approximately 50 attendees through three surveys.

- ▶ The first survey addressed functions needed by CWATMS Transportation Managers to gather information and manage traffic.
- ▶ The second survey asked the attendees to estimate how easy or difficult it would be to incorporate the functions into a workstation.
- ▶ The third survey asked the attendees more specific questions about the capabilities they would like on an integrated workstation. Questions included extent of map display; CMS locations and type of control; type of CCTV, HAR, and HAT control; ramp meter system and traffic signal system display and control; automatic incident detection and event detection capabilities; transit and commercial vehicle data and display; etc.

The disposition of comments regarding the CWATMS workplan (the version to be submitted to FHWA for approval) was almost complete as of the 10 July 2001 Priority Corridor Steering Committee meeting. The list of tasks/functions desired in the IWS were prioritized with the first two tasks ensuring that:

- ▶ All districts have a Seed to Showcase. Development of the District 12 Seed was specifically included in the CWATMS project.
- ▶ The IWS will contain core ATMS capabilities to view arterial and freeway traffic congestion information. It will also allow for control of CCTV, CMS, and HAR if interagency agreements are in place.

Since Showcase funding was running out, it was suggested that other district stakeholders might be induced to contribute funding if efforts were made to include their needs in development of the IWS. Caltrans operational needs should be examined as they concern interagency cooperation. Any funds used in the project should address the connections, data flows, and control between the agencies and districts. This echoed a very similar sentiment made two-and-a-half years earlier at a January 1999 TMS meeting.

Caltrans suggested that the task force that had been assembled to develop the priorities for the CWATMS project become an advisory group to the eventual project manager. The task force will be reconvened to discuss the issues raised above, and will consist of members from the four Caltrans districts, Caltrans HQ Operations, the two MPOs, FHWA, and any interested cities such as Los Angeles and Fontana.

By unanimous vote, a motion was passed at the July 2001 meeting to approve and submit the CWATMS workplan to FHWA for federal approval.

At the 20 September 2001 Evaluation Subcommittee meeting, there seemed to be widespread agreement among the individual Caltrans districts and other regional agencies about the need to create a network between the four Caltrans districts in the Priority Corridor. Consensus was growing that the Steering Committee should be responsible for (and only for) the interregional network between the four Caltrans districts, while the regions should be responsible for developing their own intra-regional networks to connect the local agencies and cities.

Also by September 2001, Caltrans District 8 (Inland Empire) had installed a copy of District 7's (Los Angeles') ATMS2 software, though some modification was required for integration with District 8's other existing systems.

The four Kernel servers were installed at the Caltrans TMCs, and were tested and formally accepted in November 2001.

Perhaps the hardest blow to the Showcase Program came in January 2002 when Iona, a third-party commercial-off-the-shelf (COTS) software vendor, announced its plans to discontinue supporting its ORBIX 3.x product line in the spring. Iona had recently released its ORBIX 2000 product and was encouraging users to upgrade. Because ORBIX 2000 is built on an entirely new technology, it is not backwards-compatible with the ORBIX 3.x product line. This issue created a technology rift between the four regions.

The Showcase system's CORBA implementations, including software for the Kernels and the regional systems, make extensive use of Iona's ORBIX 3.x product. Projects that had reached implementation stage were already committed to ORBIX 3.x; however, the "younger" projects were reluctant to use a technology that was quickly becoming obsolete. Since many of the San Diego projects (except for Mission Valley ATMIS) were still in the design stage, that region chose to proceed using ORBIX 2000 with licenses procured by SANDAG. This would create an incompatibility between the San Diego region's systems and the rest of the Priority Corridor. To tackle the compatibility issue, the Technical Advisory Subcommittee (TAS) agreed to meet to discuss the implications of upgrading all Showcase projects and systems to ORBIX 2000.

As of March 2002, the plan was still to use the CWATMS project and funds to develop a corridor-wide IWS with all of the major features found on most of the regional project workstations such as TravelTIP, IMAJINE, Mission Valley ATMIS, LA-Ventura ATIS, San Diego RWIS, and the Fontana-Ontario ATMIS.

By April 2002, the Fontana-Ontario ATMIS project in the Inland Empire had joined San Diego in its decision to use ORBIX 2000. The Los Angeles and Orange County regions, whose projects were already either completed or well into system development, had become committed to ORBIX 3.x. A TAS meeting was held to discuss the ramifications and cost of upgrading all necessary Showcase systems to ORBIX 2000. In short, the contractors estimated a cost of roughly \$1 million to replace the Kernel servers and upgrade all of the necessary software.

By May 2002, the direction of the Priority Corridor was that each region would develop its own stand-alone regional network with the possibility of eventually interconnecting via an interregional “backbone” sometime in the future. Since each region was beginning to go its own way, the need for developing a corridor-wide IWS as part of a CWATMS project became questionable. Although a workplan had been submitted to FHWA ten months earlier in July 2001, it had not been approved pending an accounting of Showcase dollars and the return of the money that had been diverted from the CWATMS budget to pay for warranties and use of the Caltrans WAN.

By early November 2002, plans to develop an IWS as part of a CWATMS project were virtually dead until, in December 2002, National Engineering Technology (NET) began circulating the idea that Kernel services could be fully distributed to the regional systems so that the Kernel servers wouldn’t be necessary anymore. A formal presentation of their idea was delivered at the 30 January 2003 TAS meeting. Under this plan, the Kernel services could be distributed to a next generation of regional workstations, thus eliminating the need for the Kernel servers. The ORBIX compatibility issue would also be overcome by developing these next generation workstations using ORBIX 2000. The idea eventually evolved that the CWATMS’ corridor-wide IWS could be that next generation workstation.

The first half of 2003 was dominated by the prospect that Showcase funding for Caltrans staff support would run out at the end of the State fiscal year on 30 June 2003. Past that date, there would be no more Showcase funds to pay for Caltrans staff to support and help manage the program.

Other priorities continued to compete for the unused CWATMS funds. In a letter dated 16 April 2003, the Southern California Association of Governments (SCAG) requested that unallocated Showcase funds be apportioned for the development of its regional ITS architecture. Roughly \$600,000 was granted to SCAG for this purpose.

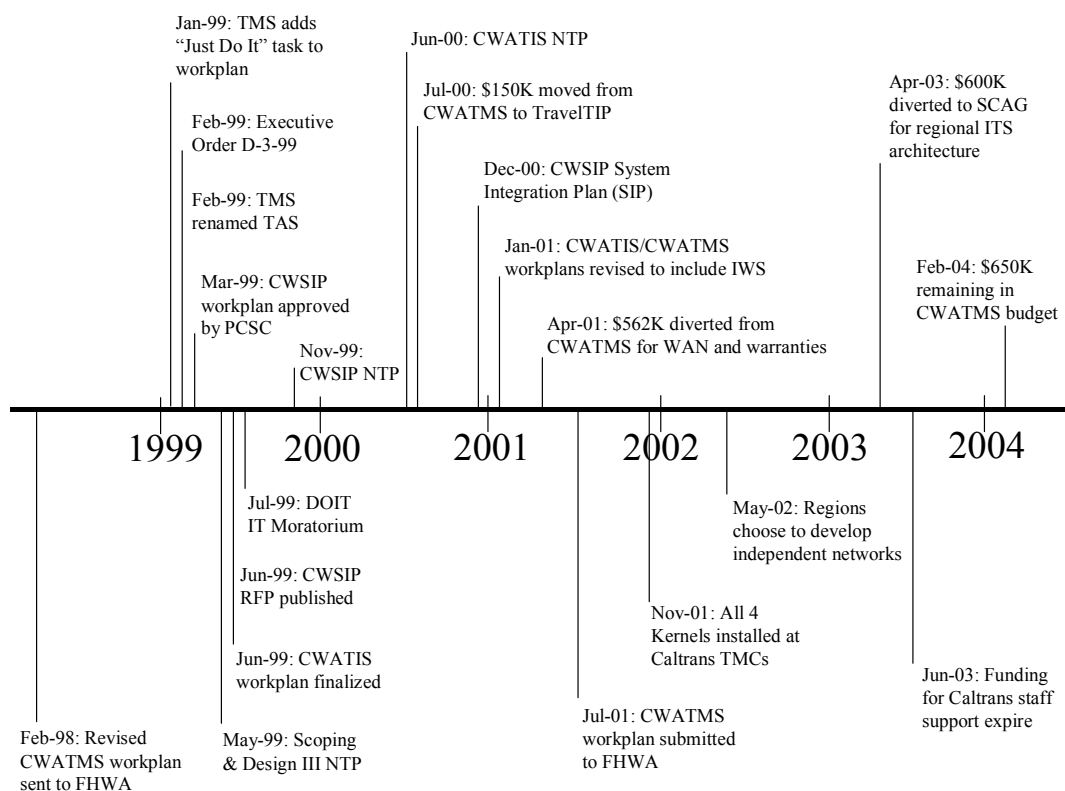
At a special technical meeting on 10 June 2003, NET provided further detailed technical information and plans for distributing the Kernel services. Each region appears to be pursuing this effort individually.

Showcase funding of Caltrans Division of Research & Innovation staff (formerly the Division of New Technology & Research) to support and manage the Showcase Program ended on 30 June 2003. These staff members have since been reassigned to other duties outside of the Showcase Program

As of February 2004, roughly \$650K is still available in the CWATMS allocation, and competing interests from around the Priority Corridor continue to approach the Steering Committee with requests to use this funding.

The events affecting the CWATMS project since 1998 are summarized in the timeline below.

Exhibit 8 – Timeline of Events Impacting CWATMS



3.2 Impact of Showcase Integration on Project Deployment and System Performance

The CWATMS is one of 17 projects that make up the Showcase Program and Network. As such, many interdependencies developed between the projects as plans were made for eventual regional and corridor-wide integration. This section describes how these interdependencies may have impacted the CWATMS and other Showcase projects.

3.2.1 Impact of the CWATMS on other Showcase Projects

Since a final CWATMS workplan has not been approved, the Evaluation can only speculate as to how CWATMS might have impacted the other Showcase projects.

A couple of factors contributed to the delay in executing a CWATMS contract as originally envisioned. First, the Caltrans TMCs were working to obtain and install ATMS2, which had become the State's standard transportation management software system. It would have been fiscally unwise to integrate the TMCs, only to have to spend more money to repeat the integration after ATMS2 had been installed. Second, the project had not received the full requested amount of federal funding, so efforts were still underway to either secure more funding or reduce the scope of the project. Nonetheless, had the CWATMS project taken place as originally planned, interregional integration throughout the Priority Corridor might have already become a reality in Southern California. Integration of the four Caltrans TMCs would have resulted in an interregional communications backbone onto which the regional systems could have eventually piggybacked to share information corridor-wide.

3.2.2 Impact of other Showcase Projects on CWATMS

The unexpected obsolescence of Iona's Orbix 3.x CORBA Orb caused integration issues with the Showcase Kernel that rippled out to all of the regional deployment projects and CWATMS.

The Showcase Architecture is based on an object-oriented software design and the use of CORBA for sharing data and calling procedures remotely. All of the systems developed under the Showcase Program, including the Kernels and the regional systems, use third-party COTS software from Iona to implement their CORBA services. In late 2001, Iona announced plans to discontinue its Orbix 3.x products and release a new version called Orbix 2000. Unfortunately, Orbix 2000 is not backwards-compatible with its Orbix 3.x predecessors.

The newer regional projects that were either still in design or very early into implementation chose to utilize Orbix 2000 even though the Kernels and other older projects were already committed to Orbix 3.x. Due to the incompatibility between Orbix 2000 and Orbix 3.x, the newer systems based on Orbix 2000 would not be able to integrate to the Orbix3.x-based Kernels. This threatened the Showcase Program's goal to develop a corridor-wide, inter-regional transportation management and information network.

The Priority Corridor Steering Committee began researching options to upgrade the Kernels and the other Orbix 3.x-based systems. With the future of the Kernels unclear, the CWATMS project partners chose to defer integration with the Showcase Network indefinitely.

4 Cost Evaluation

The cost evaluation draws information from documented costs and personal interviews. Budget information was taken directly from the project's contract and amendments, while operations and maintenance costs were obtained from discussions with agency personnel. Informal interviews were conducted to verify information and fill in any "holes" that were discovered during analysis.

4.1 Constraints & Assumptions

There is one primary consideration for the Cost Evaluation:

- ▶ Although Priority Corridor funds were set aside for the CWATMS project, a contract was never executed.

4.2 Project Budget

This section addresses the funds set aside for the CWATMS project in anticipation of executing a contract.

4.2.1 Project Budget

\$2,875,000 was initially set aside for the CWATMS project, but the money was put to use on other critical needs in the Priority Corridor. Today, about \$643,000 remains allocated to CWATMS.

A total of \$2,875,000 in federal (\$2.3 million) and state (\$575K) funds were set aside for the CWATMS project. Over time, due to hesitation in executing a contract, portions of this money were diverted to other critical needs in the Priority Corridor. Since the last diversion of funds in April 2003, roughly \$643,000 remains allocated to CWATMS.

Exhibit 9 – How CWATMS Funds have been Used

Date	Item	Credit/(Debit)	Balance
9/1997	Initial allocation	\$2,875,000	\$2,875,000
1999	Divert funds to Scoping & Design Phase 3 project	(\$920K)	\$1,955,000
7/2000	Divert funds for TravelTIP migration to Kernel v1.0	(\$150K)	\$1,805,000
4/2001	Divert funds to pay for use of Caltrans WAN	(\$300K)	\$1,505,000
4/2001	Divert funds to pay for software warranties	(\$62K)	\$1,443,000
4/2001	Divert funds for troubleshooting/contingency	(\$200K)	\$1,243,000
4/2003	Divert funds to SCAG for regional ITS architecture	(\$600K)	\$643,000

5 Institutional Impacts Evaluation

5.1 *Impacts to Local Planning Processes, Policy Development, and the Mainstreaming of ITS*

The cost and effort to integrate systems interregionally can only be justified when there is sufficient data to share – and agreements in place – to support multi-jurisdictional coordination. More work needs to be done to flesh out the regional infrastructures and to continue standardizing the Caltrans TMCs before focus is again placed on interregional integration.

Over the past 4-5 years, the four regions of the Southern California Priority Corridor have come to place local or regional integration as a higher priority than interregional or Corridor-wide integration. Los Angeles and San Diego are each developing their own regional networks to enable greater coordination between their respective local transportation agencies such as Caltrans, public transit providers, and city traffic departments.

Although CWATMS' original goal of integrating the four Caltrans TMCs in the Priority Corridor seems a logical first step towards interregional integration, the project was ahead of its time. There were too many dissimilar systems and practices among the TMCs to make integration feasible. Standardizing processes and systems (more importantly, system interfaces) at the Caltrans TMCs will help reduce the technical and institutional risk and complexity of integration.

Caltrans should continue its efforts to have a single, non-proprietary statewide standard for ATMS software. The four Southern California Caltrans districts should also work together to develop a set of protocols, policies and procedures that describe how their TMCs will work together when integration is achieved. Such a document should identify multi-jurisdictional incident scenarios and answer questions such as:

- ▶ Which district will take the lead role in responding?
- ▶ What action(s) will that district take?
- ▶ What action(s) should the other involved district(s) take, if any?
- ▶ Which field devices may be shared?

Beginning work on this set of policies and procedures before interregional integration takes place could uncover hidden requirements and assist Caltrans in procuring the most effective ATMS.

Conclusions and Recommendations

Although a CWATMS contract has not been executed within the time limits of the Showcase Program Evaluation, this report provides a historical account and current status of the project.

The technical goal of the Showcase Program was to develop an interregional network over which transportation agencies around the Southern California Priority Corridor could exchange information and share field device control for better coordination and improved safety and performance. The CWATMS project could help develop a major piece of that network; however, several considerations have impacted the Priority Corridor's ability to execute a contract for the project, including:

- **Inadequate funding** – A funding request was submitted to the Federal Highway Administration (FHWA) in December 1996 based on a proposed workplan and cost estimate prepared by agency staff and consultants. Although FHWA contributed funding for the project as part of the Showcase Program, the contribution was less than the requested amount and not enough to meet the project's anticipated cost. As a result, the Priority Corridor Steering Committee was forced to begin revising the scope of the project and re-tailoring the proposed workplan to fit the available funding. However, technical and financial issues over the ensuing years have prevented the Steering Committee from reaching consensus on a final revision.
- **ATMS Version 2 (ATMS2)** – The original goal of the CWATMS project was to integrate the Advanced Transportation Management Systems at Caltrans' four Transportation Management Centers (TMCs) in the Priority Corridor. In 1999, each of these TMCs was using its own legacy ATMS software, but Caltrans had begun a process of standardizing its TMCs by developing the ATMS2 software and installing it statewide. Due to the expected reduction in both technical risk and complexity of integration, it became a foregone conclusion that CWATMS would not start until all four Caltrans TMCs received ATMS2. The deployment of ATMS2 was subsequently delayed by two statewide Y2K-related technology moratoria, and then statewide budgetary constraints.
- **Changing priorities** – Over the past 4-5 years, the four regions of the Southern California Priority Corridor have come to place local or regional integration as a higher priority than interregional or Corridor-wide integration. Los Angeles County and San Diego County are each developing their own regional networks to enable greater coordination between their respective local transportation agencies such as Caltrans, public transit providers, and city traffic departments. Orange County and the Inland Empire are predicted to do the same. One day, these four separate regional networks may be interconnected to form the Corridor-wide network envisioned by the Showcase Program.

The Priority Corridor Steering Committee's top priority was to reach consensus on CWATMS' revised scope before obligating the available money to the project. But as the scope discussion became more drawn out, ATMS2 deployment became more uncertain, and other critical issues arose around the Priority Corridor, portions of the CWATMS funding were gradually siphoned

away and used for other Showcase Program uses. \$2,875,000 was initially set aside for the project, but about \$643,000 currently remains.

Although CWATMS' original goal of integrating the four Caltrans TMCs in the Priority Corridor seems a logical first step towards interregional integration, the project was ahead of its time. Dissimilar systems and practices among the Caltrans TMCs increased the risk and complexity of the integration. As steps towards reducing the risk and complexity of eventual Corridor-wide integration, Caltrans should continue its efforts to develop a single, non-proprietary statewide standard for ATMS software, and the four Southern California Caltrans districts should work together to develop a set of protocols, policies and procedures that describe how their TMCs will work together once this integration is achieved.

Endnotes/References

¹ ISTEA requires that “operational tests utilizing federal funds have a written evaluation of the Intelligent Vehicle Highway Systems technologies investigated and the results of the investigation.” Although Showcase is not officially an operational test, it deploys and demonstrates ITS services, functions, and technologies under “real world” conditions, similar to an operational test.

² California Statistical Abstract, Table B-4. California Department of Finance, Sacramento, CA. December 2003.

³ California Statistical Abstract, Table J-4. California Department of Finance, Sacramento, CA. December 2003.